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CR-142105

Quarterly Progress Report, September - November 1973

SKYLAB EREP Investigation 475, Contract Number NAS 9-13406

INTERDISCIPLINARY APPLICATION AND INTERPRETATION OF
EREP DATA WITHIN THE SUSQUEHANNA RIVER BASIN

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December 1973

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(E75-10139) INTERDISCIPLINARY APPLICATION AND INTERPRETATION OF EREP DATA WITHIN THE SUSQUEHANNA RIVER BASIN Quarterly Progress Report, Sep. - Nov. 1973 (Pennsylvania State Univ.) 4 p HC \$3.25	N75-17755 Unclas CSCL C8H G3/43 00139
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Progress has been made on the inventory of known mineral deposits and geologic structures in the Susquehanna River Basin. A scheme of the classification of metallic ore deposits has been developed which is suitable for pictorial display. It is a modification of the scheme proposed by Rose* and, with appropriate symbols, classifies the occurrence according to commodity type, age, habit, and size.

A literature survey has been initiated and the mineral deposit localities plotted on available base maps at the following scales:

1 inch = 9.4 miles, or 1:595,600

1 inch = 6 miles, or 1:380,160

1 inch = 4 miles, or 1:250,000

The Geological Survey of Pennsylvania has made available to us a cronoflex copy of the base map used for their 1960 Geological Map of Pennsylvania (1:250,000 scale). We have transferred fold axes and faults from ground truth data onto this map as part of the development of a tectonic and lineament map of Pennsylvania.

Five members of the Department of Geosciences have been involved in field trips in the Tyrone - Mt. Union valley to search for and verify reports of base metal mineral occurrences. A systematic sampling program of Bald Eagle Ridge between Curtin Gap and Tyrone has been started, in order to characterize the surface manifestation of lineaments crossing these ridges. Parameters used in this study include: joint density, iron and/or manganese oxide staining on joint planes, gossan zones, sulfide mineralization, and breccia zones.

Dr. Richard R. Parizek, of the Department of Geosciences, attended the Annual Meetings of Geological Society of America, held November 12-14, 1973, entitled, THE UNSTEADY EARTH. Dr. Parizek presented a paper discussing the potential value of lineaments and fracture traces, as mapped on ERTS and SKYLAB imagery, for determining the occurrence of ground water, migration of pollutants, and areas of sink hole collapse and unstable foundations. The abstract of this paper is appended to this report.

Dr. David P. Gold, of the Department of Geosciences, presented an open lecture at the Schuylkill Campus of The Pennsylvania State University on December 7, entitled, "Sputnik to Skylab".

Dr. Shelton Alexander has discovered features on ERTS images which can be geographically correlated with geothermal "hot spots". Skylab scenes from Pennsylvania will be examined for further evidence of the existence of such "hot spots".

*Bulletin M50, Pa. Geol. Survey, Part 3, Metal Mines and Occurrences in Pennsylvania, 1970.

Graduate student William Chren has commenced a search for Skylab scenes which can be used as a source of ground truth in analysis and interpretation of ERTS digital data.

To date we have received one shipment of mission 238 C130 film, flown in June as SL2 ground truth data.

ABSTRACT

Presentation by Dr. Richard R. Parizek at the Annual Meetings of the GSA

CARBONATE TERRANES, AN UNSTABLE ENVIRONMENT

Carbonate terranes are unique from an environmental viewpoint. Agricultural activity may be intensive. This attracts population and industrial centers, utilities and transportation networks which have increased physical, chemical and biological stresses and risks to life, property and quality of life. Water quality has been degraded or polluted by agricultural activity, waste disposal, storm-water runoff, highway construction and maintenance and utilities. Leaky pipeline and storage facilities have caused serious pollution and hazardous conditions. Land settlement may be imperceptible to catastrophic, natural or man induced through dam and highway construction, urban and industrial activity, mining and ground water development. Sinkholes may develop slowly or in seconds and range from a few feet to hundreds of feet in diameter. Stream flow variability commonly is decreased as carbonate rock area increases. People have been attracted into flood areas including flood plains, poorly drained surface depressions, polje lake basins, and areas of extreme water-table fluctuation. Protection of agricultural land, mineral and ground-water resources and property can be achieved by taxation policies, environmental mapping, planning and zoning ordinances that consider geomorphic and hydrologic factors, and by appropriate statutes regulating man's activities. Foundation, reservoir, dam, mine, tunnel, and water-supply failures can be minimized through knowledge of karst processes and controlling factors, geologic mapping, aerial photo and remote sensing studies, geophysical and test drilling exploration. Educational programs are mandatory for professionals and the public.